PATENT COOPERATI I TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and Administrative Instructions, Section 422)

To:

NASSIF, Omar, A.
Gowling, Lafleur, Henderson LLP
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Commerce Court West
Toronto, Ontario M5L 1J3
CANADA

Date of mailing (day/month/year)
13 juin 2001 (13.06.01)

Applicant's or agent's file reference
T8465247WO

IMPORTANT NOTIFICATION

International application No.
PCT/CA00/01001

International filing date (day/month/year)
01 septembre 2000 (01.09.00)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address

NASSIF, Omar, A.
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2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☐ the name ☒ the address ☐ the nationality ☐ the residence

Name and Address

NASSIF, Omar, A.
Gowling, Lafleur, Henderson LLP
Suite 4900
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State of Nationality:
State of Residence:
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3. Further observations, if necessary:
The indication of a new address of the agent on the Demand (Form PCT/IPEA/401) has been considered a request for recording a change under Rule 92bis. In case of disagreement, the International Bureau should be notified immediately.

4. A copy of this notification has been sent to:

☒ the receiving Office
☐ the International Searching Authority
☒ the International Preliminary Examining Authority
☐ the designated Offices concerned
☒ the elected Offices concerned
☐ other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

Authorized officer
Claudio Borton
Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 13 June 2001 (13.06.01)	
International application No. PCT/CA00/01001	**Applicant's or agent's file reference** T8465247WO
International filing date (day/month/year) 01 September 2000 (01.09.00)	**Priority date** (day/month/year) 03 September 1999 (03.09.99)
Applicant PEARCEY, Richard	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

02 April 2001 (02.04.01)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

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Telephone No.: (41-22) 338.83.38

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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WO 01/17906 A1

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1 September 2000 (01.09.2000)

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60/152,282 3 September 1999 (03.09.1999) US

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(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **PEARCEY, Richard** [CA/CA]; 9 Dengate Crescent, London, Ontario N5W 1V7 (CA).

(74) Agents: NASSIF, Omar, A. et al.; Gowling, Strathy & Henderson, Suite 4900, Commerce Court West, Toronto, Ontario M5L 1J3 (CA).

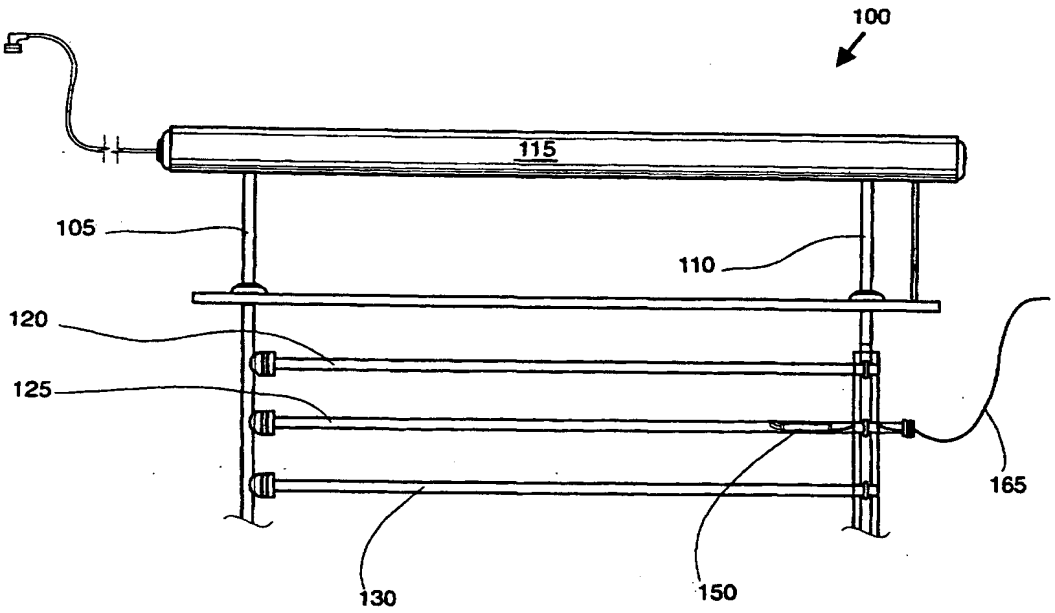
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*
— *Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.*

[Continued on next page]

(54) Title: FLUID TREATMENT SYSTEM, RADIATION SOURCE ASSEMBLY AND RADIATION SOURCE MODULE



(57) Abstract: A radiation source module for use of fluid treatment system. The radiation source module comprises: a frame (105) having a first support member; at least one radiation source assembly (125) extending from and in engagement with a first support member, the at least one radiation source assembly comprising at least one radiation source disposed within a protective sleeve; and an optical radiation sensor (150) disposed within the protective sleeve. The radiation source module is particularly useful in ultraviolet radiation treatment systems used to disinfect wastewater.

WO 01/17906 A1

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

FLUID TREATMENT SYSTEM, RADIATION SOURCE ASSEMBLY AND RADIATION SOURCE MODULE

TECHNICAL FIELD

In one of its aspects, the present invention relates to a radiation source assembly. In another of its aspects, the present invention relates to a radiation source module comprising a novel radiation source assembly having incorporated therein an optical radiation sensor.

BACKGROUND ART

Optical radiation sensors are known and find widespread use in a number of applications. One of the principal applications of optical radiation sensors is in the field of ultraviolet radiation fluid disinfection systems.

It is known that the irradiation of water with ultraviolet light will disinfect the water by inactivation of microorganisms in the water, provided the irradiance and exposure duration are above a minimum "dose" level (often measured in units of microWatt seconds per square centimetre). Ultraviolet water disinfection units such as those commercially available from Trojan Technologies Inc. under the tradenames UV700 and UV8000, employ this principle to disinfect water for human consumption. Generally, water to be disinfected passes through a pressurized stainless steel cylinder which is flooded with ultraviolet radiation. Large scale municipal waste water treatment equipment such as that commercially available from Trojan Technologies Inc. under the trade-names UV3000 and UV4000, employ the same principal to disinfect waste water. Generally, the practical applications of these treatment systems relates to submersion of treatment module or system in an open channel wherein the wastewater is exposed to radiation as it flows past the lamps. For further discussion of fluid disinfection systems employing ultraviolet radiation, see any one of the following:

United States Patent 4,482,809,
United States Patent 4,872,980,

United States Patent 5,006,244,
United States Patent 5,418,370,
United States Patent 5,539,210, and
United States Patent 5,590,390.

In many applications, it is desirable to monitor the level of ultraviolet radiation present within the water under treatment. In this way, it is possible to assess, on a continuous or semi-continuous basis, the level of ultraviolet radiation, and thus the overall effectiveness and efficiency of the disinfection process.

It is known in the art to monitor the ultraviolet radiation level by deploying one or more passive sensor devices near the operating lamps in specific locations and orientations which are remote from the operating lamps. These passive sensor devices may be photodiodes, photoresistors or other devices that respond to the impingent of the particular radiation wavelength or range of radiation wavelengths of interest by producing a repeatable signal level (in volts or amperes) on output leads.

Conventional ultraviolet disinfection systems often incorporate arrays of lamps immersed in a fluid to be treated. Such an arrangement poses difficulties for mounting sensors to monitor lamp output. The surrounding structure is usually a pressurized vessel or other construction not well suited for insertion of instrumentation. Simply attaching an ultraviolet radiation sensor to the lamp module can impede flow of fluid and act as attachment point for fouling and/or blockage of the ultraviolet radiation use to treat the water. Additionally, for many practical applications, it is necessary to incorporate a special cleaning system for removal of fouling materials from the sensor to avoid conveyance of misleading information about lamp performance.

It would be desirable to have a radiation source assembly and module containing same which incorporated an optical radiation sensor that does not interfere with the flow of water or exposure of the fluid being treated to radiation.

DISCLOSURE OF THE INVENTION

It is an object of the present invention to provide a novel radiation source module which obviates or mitigates at least one of the above-mentioned disadvantages of the prior art.

It is another object of the present invention to provide a novel radiation source assembly which obviates or mitigates at least one of the above-mentioned disadvantages of the prior art.

Accordingly, in one of its aspects, the present invention provides a radiation source module for use of fluid treatment system, the module comprising:

a frame having a first support member;

at least one radiation source assembly extending from and in engagement (preferably sealing engagement) with a first support member, the at least one radiation source assembly comprising at least one radiation source disposed within a protective sleeve; and

an optical radiation sensor disposed within the protective sleeve.

In another of its aspects, the present invention provides a radiation source assembly for use in a radiation source module, the radiation source assembly comprising at least one radiation source and an optical radiation sensor, both the at least one radiation source and the optical radiation sensor being disposed within a protective sleeve.

In yet another of its aspects, the present invention provides a fluid treatment system comprising:

a fluid treatment zone;

at least one radiation source assembly disposed in the fluid treatment zone, the at least one radiation source assembly comprising at least one radiation source disposed within a protective sleeve; and

an optical radiation sensor disposed within the protective sleeve.

In a preferred embodiment of the fluid treatment system, the fluid treatment zone comprises a housing through which fluid flows. Preferably, the at least one radiation source assembly is secured to the housing.

Thus, the present inventor has discovered that, by placing an optical radiation sensor within a protective sleeve commonly employed in combination with a radiation source, a number of advantages accrue. For example, the need to periodically clean the surface of the sensor from fouling materials is obviated since the sensor is disposed within the protective sleeve. This is particularly advantageous when the radiation source assembly is used in conjunction with a cleaning system (e.g., one of the cleaning systems in the '370, '210 and/or '390 patents referred to above). Specifically, since the cleaning system serves the purpose of removing fouling materials from the protective sleeve to allow for optimum dosing of radiation, a separate cleaning system for the sensor is not required. Further, since the optical radiation sensor is disposed within an existing element (the protective sleeve) of the radiation source module, incorporation of the sensor in the module does not result in any additional hydraulic head loss and/or does not create a "catch" for fouling materials. Other advantages will be apparent to those skilled in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the present invention will be described with reference to the accompanying drawings, in which:

Figure 1 is a side elevation of an embodiment of the present radiation source module;

Figure 2 is a sectional view of a trio of radiation source modules including the radiation source module illustrated in Figure 1; and

Figure 3 illustrates an enlarged sectional view taken along line A-A in Figure 2.

BEST MODE FOR CARRYING OUT THE INVENTION

With reference to Figures 1-2, a radiation source module 100 is illustrated. Radiation source module 100 comprises a pair of support legs 105,110 depending from a crosspiece 115. Disposed between support legs 105,110 are a trio of radiation source assemblies 120,125,130. Each radiation source assembly 120,125,130 comprises a radiation source 140 (e.g., an ultraviolet emitting lamp)

disposed within a protective sleeve 145 (e.g., typically made of quartz). The design of support legs 105,110 and radiation source assemblies 120 is preferably as is described in United States Patents 4,872,980 and 5,006,244 referred to hereinabove.

Preferably, each protective sleeve 145 is connected to support leg 105 via a coupling nut 150. The details of this connection are preferably as set out in copending United States patent application S.N. 09/258,142 (Traubenberg et al.).

With reference to Figures 2 and 3, radiation source assembly 125 comprises an optical radiation sensor 150 disposed within protective sleeve 145 adjacent support leg 110. Optical sensor 150 comprises a window 155(optional) which receives incident radiation and passes this radiation into a body 160 that contains a photodiode (not shown) or other radiation sensor material as described above. A signal related to the amount of radiation sensed is then sent from body 160 through a lead 165 which is connected to a conventional control system which allows the user to ascertain the level of radiation sensed compared to a predetermined benchmark.

Preferably, sensor 160 is oriented within protective sleeve 145 in a manner that it receives incident radiation from at least one, preferably both, of adjacent radiation source assemblies 120,130. In other words, it is preferred that sensor 150 not receive incident radiation from the radiation source contained within the same protective sleeve in which sensor 150 is housed.

The sensor itself may be chosen from conventional sensors. For example, a suitable sensor is commercially available from UDT Sensors Inc. (Hawthorne, California).

As shown in Figure 2, radiation source module 100 may be a member of an array of radiation source modules which do not contain an optical radiation source sensor. Thus, the trio of radiation source modules illustrated in Figure 2 could be placed in an open channel as shown in United States Patents 4,872,980 and 5,006,244 and used to treat wastewater as set out in those patents.

While the present invention has been described with reference to preferred and specifically illustrated embodiments, it will of course be understood by those skilled in the arts that various modifications to these preferred and illustrated

embodiments may be made without the parting from the spirit and scope of the invention. For example, while the present invention has been illustrated with reference to radiation source modules similar in general design to those taught in United States Patents 4,872,980 and 5,006,244, it is possible to employ the present radiation source assembly in a module such as the one illustrated in United States Patents 5,418,370 , 5,539,210 and 5,590,390 - i.e., in a module having a single support for one or more elongate source assemblies extending therefrom.. Further, it is possible to employ the present radiation source assembly in a fluid treatment device such as those commercially available from Trojan Technologies Inc. under the tradenames UV700 and UV8000. Still, further, while, in the embodiments illustrated and described above, the optical sensor is disposed at the end of the projective sleeve opposite the end where electrical connections for the lamp are located, it possible to locate the optical radiation sensor at the same end as the electrical connections for the lamp thereby allowing for use of the protective sleeve having one closed end. Still further, it is possible to utilize an optical radiation source sensor disposed between two radiation sources, all of which are disposed within a protective sleeve. Other modifications which do not depart from the spirit and scope of the present invention will be apparent to those skilled in the art.

All publications, patents and patent applications referred to herein are incorporated by reference in their entirety to the same extent as if each individual publication, patent or patent application was specifically and individually indicated to be incorporated by reference in its entirety.

What is claimed is:

1. A radiation source module for use of fluid treatment system, the module comprising:

a frame having a first support member;

at least one radiation source assembly extending from and in engagement with a first support member, the at least one radiation source assembly comprising at least one radiation source disposed within a protective sleeve; and

an optical radiation sensor disposed within the protective sleeve.

2. The radiation source module defined in claim 1, wherein the frame further comprises a second support member opposed to and laterally spaced from the first support member, the at least one radiation source assembly disposed between each of the first support member and the second support member.

3. The radiation source module defined in claim 2, wherein the frame further comprises a third support member interconnecting the first support member and the second support member.

4. The radiation source module defined in any one of claims 1-3, wherein the frame further comprises a ballast for controlling the at least one radiation source.

5. The radiation source module defined in any one of claims 1-4, wherein the first support member comprises a hollow passageway for receiving a lead wire for conveying electricity to the at least one radiation source.

6. The radiation source module defined in any one of claims 1-5, wherein the protective sleeve comprises a quartz sleeve.

7. The radiation source module defined in any one of claims 1-6, wherein the radiation source module comprises a plurality of radiation source assemblies at

least one radiation source assembly comprising the optical radiation sensor disposed within the protective sleeve.

8. The radiation source module defined in claim 7, wherein the radiation source module comprises at least one radiation source assembly having no optical radiation sensor.

9. The radiation source module defined in any one of claims 1-8, wherein the radiation source assembly comprises a plurality radiation sources.

10. The radiation source module defined in any one of claims 1-9, wherein the optical radiation sensor is disposed adjacent one end of the protective sleeve.

11. A radiation source assembly for use in a radiation source module, the radiation source assembly comprising at least one radiation source and an optical radiation sensor, both of the at least one radiation source and the optical radiation sensor being disposed within a protective sleeve.

12. The radiation source assembly defined in claim 11, wherein the protective sleeve comprises a quartz sleeve.

13. The radiation source assembly defined in any one of claims 11-12, wherein the radiation source module comprises a plurality of radiation source assemblies at least one radiation source assembly comprising the optical radiation sensor disposed within the protective sleeve.

14. The radiation source assembly defined in claim 13, wherein the radiation source module comprises at least one radiation source assembly having no optical radiation sensor.

15. The radiation source assembly defined in any one of claims 11-14, wherein the radiation source assembly comprises a plurality of radiation sources.

16. The radiation source assembly defined in any one of claims 11-15, wherein the optical radiation sensor is disposed adjacent one end of the protective sleeve.

17. A fluid treatment system comprising:

a fluid treatment zone;

at least one radiation source assembly disposed in the fluid treatment zone, the at least one radiation source assembly comprising at least one radiation source disposed within a protective sleeve; and

an optical radiation sensor disposed within the protective sleeve.

18. The fluid treatment system defined in claim 17, wherein the fluid treatment zone comprises a housing through which fluid flows.

19. The fluid treatment system defined in claim 18, wherein the at least one radiation source assembly is secured to the housing.

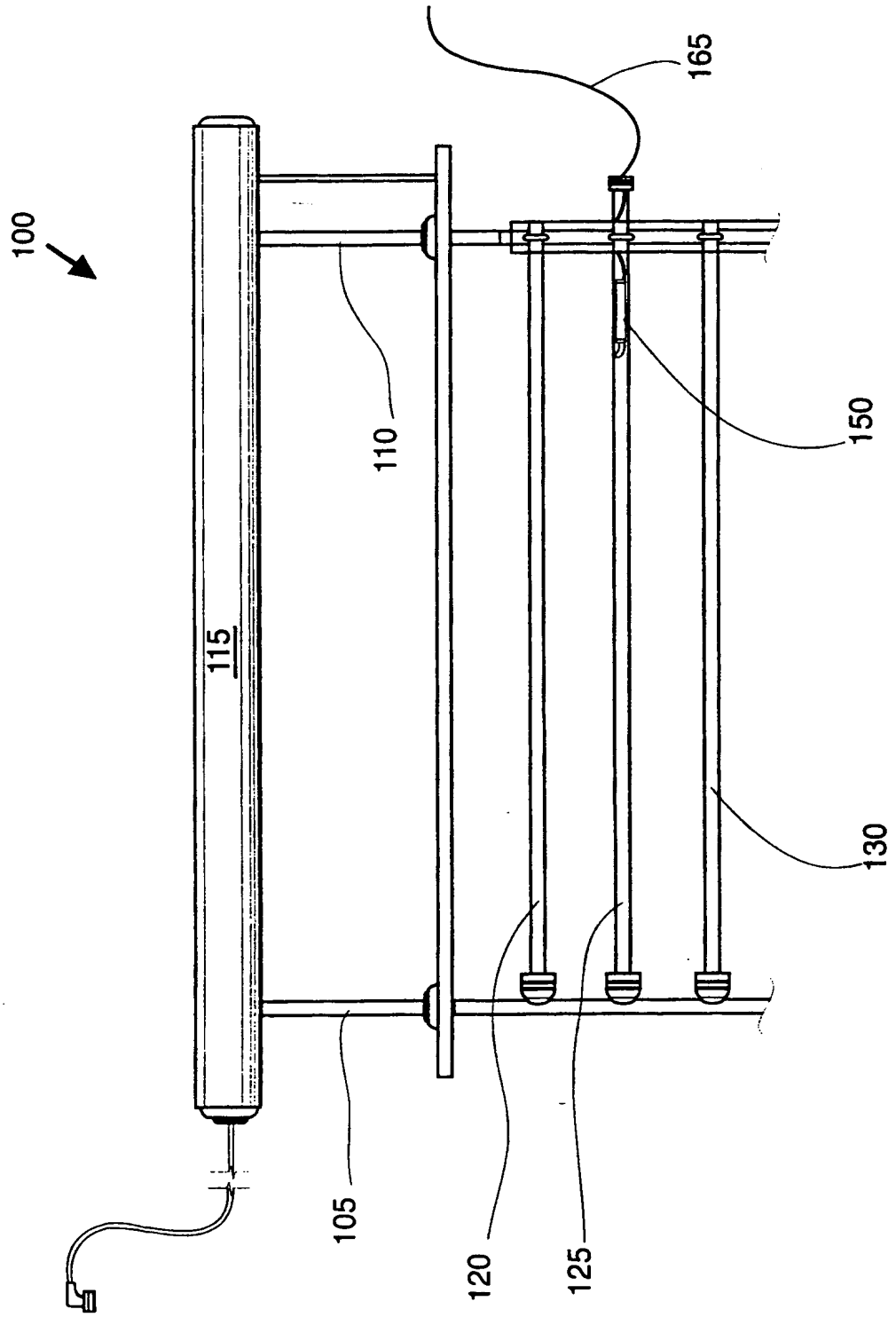


Figure 1

2/3

Figure 2

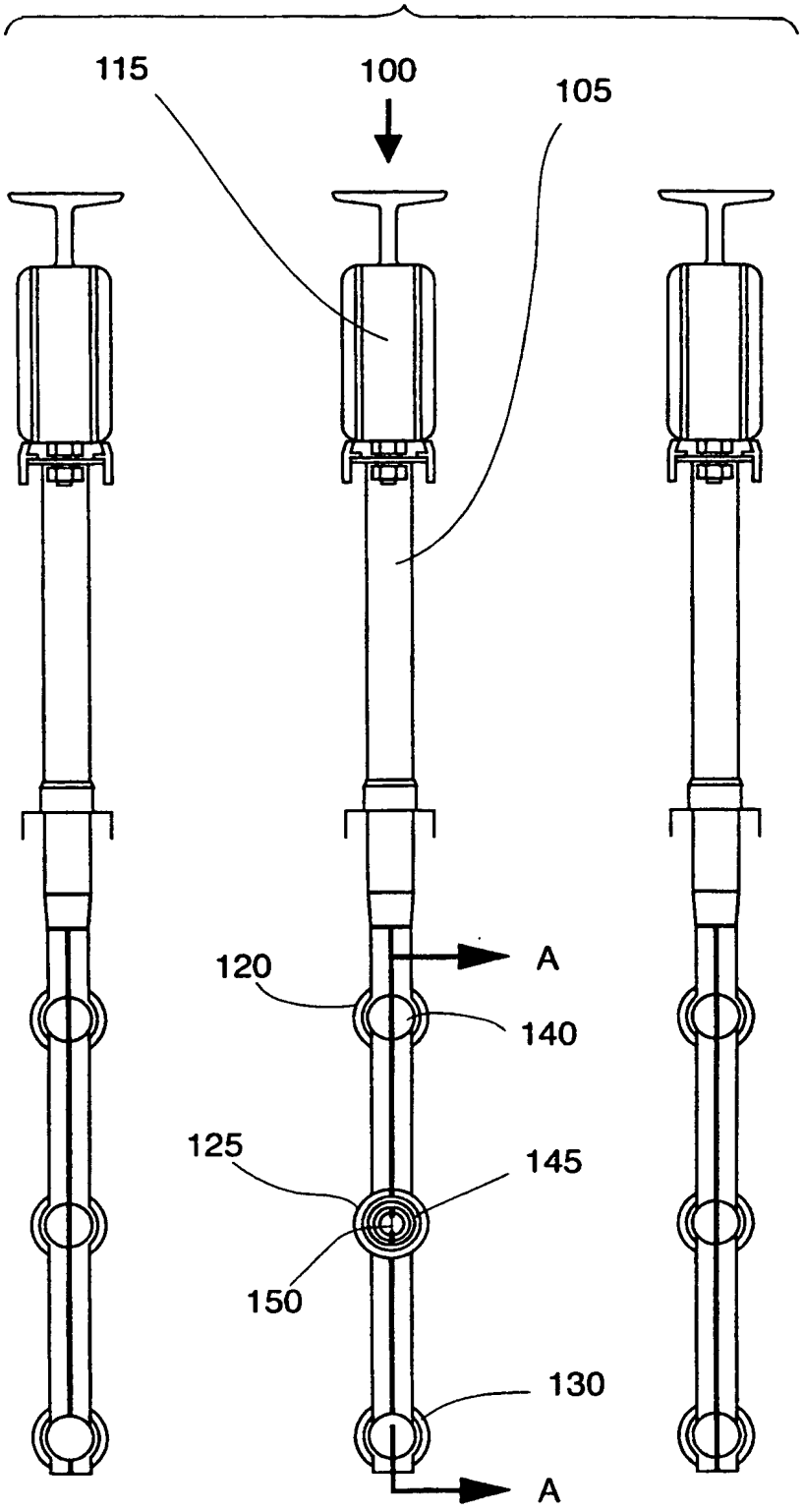
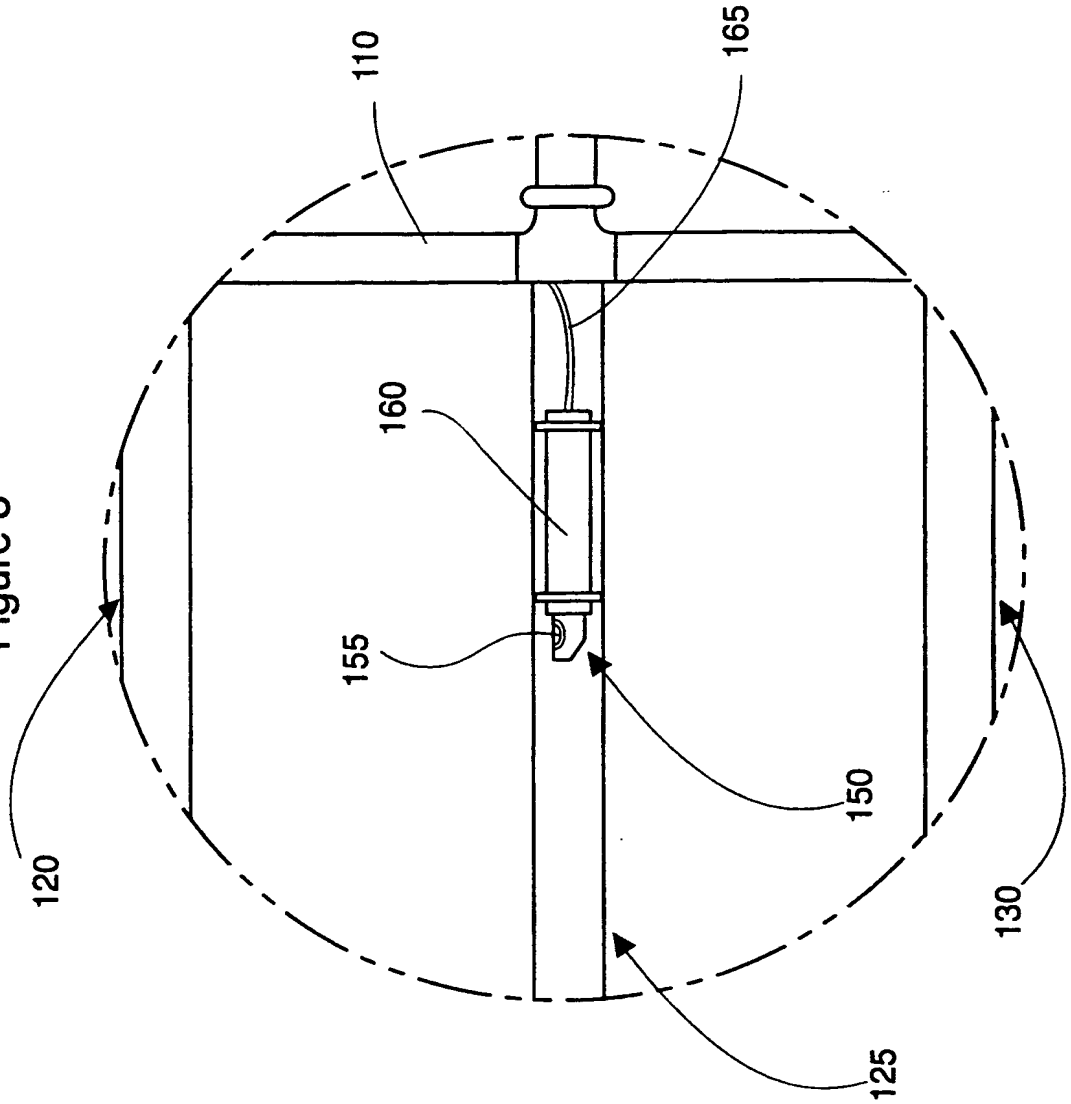


Figure 3



INTERNATIONAL SEARCH REPORT

Interr nal Application No
PCT/CA 00/01001

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C02F1/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 5 660 719 A (ALBERTAZZI PAUL ET AL) 26 August 1997 (1997-08-26) column 8, line 37-48; figure 2	11,12, 14-16 1-9, 17-19
X A	US 4 103 167 A (ELLNER SIDNEY) 25 July 1978 (1978-07-25) column 4, line 24-41; figures 2A,3A,3B	11,12, 14-16 1-9, 17-19
X A	EP 0 467 465 A (BERSON MILIEUTECH) 22 January 1992 (1992-01-22) column 3, line 29-51; figures 1,2	11,12, 14-16 1-9, 17-19

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 January 2001	31/01/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Gruber, M

Form PCT/ISA/210 (second sheet) (July 1992)

International Application No
PCT/CA 00/01001

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 204 956 A (FLATOW ROBERT E) 27 May 1980 (1980-05-27)	11,12, 15,16
A	column 4, line 13-44; figure 6	1-10,13, 14,17-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter nal Application No
PCT/CA 00/01001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5660719 A	26-08-1997	CA 2139887 A	24-06-1996
US 4103167 A	25-07-1978	DE 2825672 A	13-12-1979
		GB 1602209 A	11-11-1981
		US RE34513 E	18-01-1994
EP 0467465 A	22-01-1992	NL 9001605 A	17-02-1992
		JP 4227097 A	17-08-1992
US 4204956 A	27-05-1980	NONE	

TENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
T8465247WO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/CA 00/ 01001	01/09/2000	03/09/1999
Applicant		
TROJAN TECHNOLOGIES INC. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [ ] the text is approved as submitted by the applicant.

   [X] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1

   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of th first sheet)

The abstract is changed as follow:

Line 2: after "frame" insert "(105)";
Line 3: after "assembly" insert "(125)";
Line 6: after "sensor" insert "(150)".

INTERNATIONAL SEARCH REPORT

International Application No
PCT/CA 00/01001

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C02F1/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X A	US 5 660 719 A (ALBERTAZZI PAUL ET AL) 26 August 1997 (1997-08-26) column 8, line 37-48; figure 2	11,12, 14-16 1-9, 17-19
X A	US 4 103 167 A (ELLNER SIDNEY) 25 July 1978 (1978-07-25) column 4, line 24-41; figures 2A,3A,3B	11,12, 14-16 1-9, 17-19
X A	EP 0 467 465 A (BERSON MILIEUTECH) 22 January 1992 (1992-01-22) column 3, line 29-51; figures 1,2	11,12, 14-16 1-9, 17-19

-/--

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 January 2001	31/01/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Gruber, M

3

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X A	US 4 204 956 A (FLATOW ROBERT E) 27 May 1980 (1980-05-27) column 4, line 13-44; figure 6 -----	11,12, 15,16 1-10,13, 14,17-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/CA 00/01001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5660719 A	26-08-1997	CA 2139887 A	24-06-1996
US 4103167 A	25-07-1978	DE 2825672 A	13-12-1979
		GB 1602209 A	11-11-1981
		US RE34513 E	18-01-1994
EP 0467465 A	22-01-1992	NL 9001605 A	17-02-1992
		JP 4227097 A	17-08-1992
US 4204956 A	27-05-1980	NONE	

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

To:
GOWLING, STRATHY & HENDERSON
Attn. NASSIF, Omar A.
Suite 4900 Commerce Court West
Toronto, Ontario M5L 1J3
CANADA

Applicant's or agent's file reference T8465248WO	Date of mailing *(day/month/year)* 31/01/2001 **FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/CA 00/ 01002	International filing date *(day/month/year)* 01/09/2000
Applicant TROJAN TECHNOLOGIES INC. et al.	

1. [X] The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Fascimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

[ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

[ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Gennaro Cappiello

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international pbulication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application I English, the letter must be in English; if the language of the international application is French, the letter must be in French.

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped),whether

(i) the claim is unchanged;

(ii) the claim is cancelled;

(iii) the claim is new;

(iv) the claim replaces one or more claims as filed;

(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international appplication is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION** see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
T8465248WO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/CA 00/ 01002	01/09/2000	03/09/1999
Applicant		
TROJAN TECHNOLOGIES INC. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [ ] the text is approved as submitted by the applicant.

   [X] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1

   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

Box III TEXT OF THE ABSTRACT (C ntinuati n of item 5 of the first sheet)

The abstract is changed as follow:

Line 2: after "collector" insert "(152)";
Line 4: after "element" insert "(154)".

INTERNATIONAL SEARCH REPORT

International Application No
PCT/CA 00/01002

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C02F1/32 G01J1/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C02F G01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 297 07 052 U (DELTA UV SERVICE & SYSTEME GMB) 6 November 1997 (1997-11-06)	1-4,6,7, 10-15, 17,18,21
Y	the whole document	5,9,16, 20, 32-35, 37,38,41

Y	US 5 660 719 A (ALBERTAZZI PAUL ET AL) 26 August 1997 (1997-08-26)	32-35, 37,38,41
A	column 8, line 37-48; figure 2	22-26

Y	US 5 452 135 A (MAKI KIMIO ET AL) 19 September 1995 (1995-09-19)	5,9,16, 20
A	the whole document	26,30, 36,40

	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 January 2001	31/01/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Gruber, M

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/CA 00/01002

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 103 167 A (ELLNER SIDNEY) 25 July 1978 (1978-07-25) column 4, line 24-41; figures 3A,3B	32-41
A	US 4 602 162 A (CLUZEL JOHN M ET AL) 22 July 1986 (1986-07-22) the whole document	

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-10

   Optical radiation sensor

2. Claims: 11-21

   Radiation source module

3. Claims: 22-31

   Radiation source assembly

4. Claims: 32-41

   Fluid treatment system

INTERNATIONAL SEARCH REPORT

[redacted]national application No.
PCT/CA 00/01002

Box I Observations where certain claims wer found unsearchabl (Continuation of it m 1 of first sh et)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/CA 00/01002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 29707052 U	06-11-1997	NONE	
US 5660719 A	26-08-1997	CA 2139887 A	24-06-1996
US 5452135 A	19-09-1995	JP 3092276 B	25-09-2000
		JP 5175908 A	13-07-1993
US 4103167 A	25-07-1978	DE 2825672 A	13-12-1979
		GB 1602209 A	11-11-1981
		US RE34513 E	18-01-1994
US 4602162 A	22-07-1986	NONE	

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

NASSIF, Omar, A. et al.
Gowling, Lafleur, Henderson LLP
Suite 4900
Commerce Court West
Toronto, Ontario M5L 1J3
CANADA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing *(day/month/year)*	08.01.2002
Applicant's or agent's file reference T8465247WO	**IMPORTANT NOTIFICATION**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/CA00/01001	01/09/2000	03/09/1999

Applicant
TROJAN TECHNOLOGIES INC. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/	Authorized officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Michaleczek, N Tel.+49 89 2399-7254

Form PCT/IPEA/416 (July 1992)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
T8465247WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/CA00/01001	01/09/2000	03/09/1999
International Patent Classification (IPC) or national classification and IPC C02F1/32		
Applicant TROJAN TECHNOLOGIES INC. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
02/04/2001	08.01.2002
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Schwaller, J-M Telephone No. +49 89 2399 8351

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/CA00/01001

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
D scription, pages:

1-6 as originally filed

Claims, No.:

1-19 as originally filed

Drawings, sheets:

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1,11,17
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-19
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

2. Citations and explanations
   see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

R It m V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:
   D1: US-A-5660719
   D2: US-A-4103167
   D3: EP-A-0467465
   D4: US-A-4204956

2. The subject-matter of at least independent claims 1, 11 and 17 is **anticipated und r novelty** by the disclosure of documents **D1** (column 8, lines 37-48; Figure 2), **D2** (column 4, lines 24-41; Figures 2A, 3A, 3B), **D3** (column 3, lines 29-51; Figures 1-2) and **D4** (column 4, lines 13-44; Figure 6).

   Said claims therefore do not meet the requirements of Article 33(1) and (2) PCT.

3. Dependent claims 2-10, 12-16 and 18-19 do not appear to contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, said features being either known from the above prior art or within the competence of a skilled man seeking to improve the device known from D1, D2, D3 or D4.

   The above-mentioned dependent claims do therefore also not meet the requirements of Article 33 PCT.

R Item VIII

C rtain observations on the international application

Although claims 1, 11 and 17 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and/or in respect of the terminology used for the features of that subject-matter.

The aforementioned claims therefore **lack concis n ss**.

Moreover, **lack of clarity** of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

Hence, the claims do not meet the requirements of Article 6 PCT.

PATENT COOPERATION TREATY

PCT

REC'D 11 JAN 2002
WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

12

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
T8465247WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/CA00/01001	01/09/2000	03/09/1999
International Patent Classification (IPC) or national classification and IPC C02F1/32		
Applicant TROJAN TECHNOLOGIES INC. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
02/04/2001	08.01.2002
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Schwaller, J-M Telephone No. +49 89 2399 8351

Form PCT/IPEA/409 (cover sheet) (January 1994)

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-6	as originally filed

Claims, No.:

1-19	as originally filed

Drawings, sheets:

1/3-3/3	as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   - ☐ the description, pages:
   - ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1,11,17
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-19
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re It m V

Reasoned stat ment und r Article 35(2) with r gard to novelty, inventiv tep or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:
   D1: US-A-5660719
   D2: US-A-4103167
   D3: EP-A-0467465
   D4: US-A-4204956

2. The subject-matter of at least independent claims 1, 11 and 17 is **anticipated under novelty** by the disclosure of documents **D1** (column 8, lines 37-48; Figure 2), **D2** (column 4, lines 24-41; Figures 2A, 3A, 3B), **D3** (column 3, lines 29-51; Figures 1-2) and **D4** (column 4, lines 13-44; Figure 6).

   Said claims therefore do not meet the requirements of Article 33(1) and (2) PCT.

3. Dependent claims 2-10, 12-16 and 18-19 do not appear to contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, said features being either known from the above prior art or within the competence of a skilled man seeking to improve the device known from D1, D2, D3 or D4.

   The above-mentioned dependent claims do therefore also not meet the requirements of Article 33 PCT.

Re Item VIII

Certain observations on the international application

Although claims 1, 11 and 17 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and/or in respect of the terminology used for the features of that subject-matter.

The aforementioned claims therefore **lack concis n ss**.

Moreover, **lack of clarity** of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

Hence, the claims do not meet the requirements of Article 6 PCT.